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ABSTRACT

Data from the Current Population Surveys of the U.S. Census were used to construct this report on the access to and use of computers and information technology by the Hispanic population of the United States. The report explores four main issues, each of which is being transformed by innovations in information technology. The first issue considered is that of employment. Computer literacy is rapidly becoming a prerequisite for employability. Latinos lag behind society as a whole in using computers on the job, a reality that increases the prospects for technological obsolescence and potential unemployment. In the second issue, education, a look at the country as a whole shows that currently, about one Latino child in two uses a computer in school, signaling an opportunity for underserved groups to develop the skills they will need in a 21st century economy. Computers in the home is another area of concern. As of 1993, only about one Latino household in eight had access to a home computer, about half the figure for non-Hispanic Whites. Low educational attainment, high poverty, and lower skill occupational status contribute to explaining why Latinos are lagging behind society in gaining access to the information highway. A final issue considered is that of computer-mediated public life. By the year 2000, about 75% of all federal and state services will be processed electronically. Without public and private points of access, many Latinos could be further marginalized from public life. (Contains 7 figures, 6 tables, and 29 references.) (SLD)

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ED 414 359

LATINOS AND INFORMATION TECHNOLOGY

PREPARING FOR THE 21ST CENTURY

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FOREWORD

IF USE OF COMPUTERS ON THE JOB, at school and in the home provide "the keys to the vault" of the emerging National Information Infrastructure, as a recent Commerce Department report suggests, then Latinos have a long way to go before they can unlock the treasures promised by access to new information and communication tools. The Tomás Rivera Center's analysis of computer access reveals that Latinos lag behind society as a whole in use of computers on the job, at school and in the home. Moreover, this palpable gap has actually widened over the past decade, with the notable exception of student's access to computers in the classroom.

Why are Latinos disadvantaged relative to other groups in accessing computer technology? How can Latino communities become full participants in a rapidly changing, post-industrial society? This report does not pretend to answer these questions conclusively; its policy recommendations, however, derive from a first-of-its-kind multivariate analysis of the factors that influence Latino access to the technological tools required to prepare individuals for the twenty-first century.

Harry P. Pachon, Ph.D.
President

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Vice President

EXECUTIVE SUMMARY

TO BE A FULL PARTICIPANT in the emerging technological society will undoubtedly require some threshold level of computer literacy. Information and communication technologies are becoming mainstays of economic, social and political life. Without access to these tools, many persons in society may face marginalization, unable to succeed in the new economy. Ensuring that Latinos have the opportunity to master information technology benefits society as a whole, affording the U.S. a competitive advantage in the global marketplace.

The following issues will be explored in this report, with an eye toward understanding how Latinos will be impacted by the transformations underway in the economy and in technology.

EMPLOYMENT IN THE NEW ECONOMY

Computer literacy is rapidly becoming a prerequisite for employability in today's economy. The earning power of those with PC skills is between ten and fifteen percent greater than for those without. What is striking is that Latinos lag behind society as a whole in using computers on the job, a reality that increases the prospects for technological obsolescence and potential unemployment in a technology-intensive society.

EDUCATING YOUTH FOR THE TWENTY-FIRST CENTURY

Currently, about one Latino child in two uses a computer at school, signaling an opportunity for underserved groups to develop the skills they will need in a twenty-first century economy.

COMPUTERS IN THE HOME

As of 1993, only about one Latino household in eight had access to a home computer, one-half the figure for non-Hispanic Whites. In addition, the rate of increase in computer access for Latinos is less than that for non-Latinos. TRC's analysis reveals that low educational attainment, high poverty rates, and lower-skill occupational status contribute to explaining why Latinos are lagging behind society in finding the on-ramps to the information highway.

TOWARD COMPUTER-MEDIATED PUBLIC LIFE

By the year 2000, about 75 percent of all federal and state services will be processed electronically—benefits such as monetary and inkind benefits, job training, and grants and contracts. Information technology is transforming political communication and the delivery of services, and without private and public points of access, many Latinos could be further marginalized from public life.

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INTRODUCTION

THIS REPORT IS RELEVANT to the current policy debate over the development of the information highway. In particular, the findings contribute in two ways to understanding the place of Latinos* in today's technological society. First, the paucity of information and knowledge concerning what is at stake for Latinos is haunting. As we move into an information society, many of the jobs that Latinos have traditionally performed, particularly in the manufacturing, agricultural and service sectors, are being transformed or made obsolete due to the growth and restructuring of the economy and information technology.

Technology is not a neutral force in the lives of most Americans. The new economy makes it necessary for Latinos, indeed all Americans, to acquire the skills and knowledge to adapt to it successfully. More specifically, if Latinos do not have access to the education, training, and other resources commensurate with high-skill employment, many may be left in the wake of the so-called third-wave information society. As most sectors of the economy are downsized, many Latinos, whether currently in the education system, employed, or looking for employment, will in all probability need to learn new, computer-related skills or face marginalization in the global economy. This report outlines some of the key issues to which policy makers should attend to ensure that Latinos will be full participants in this society.

Second, the debate generated in recent years regarding the reform of telecommunications policy at both the federal and the state levels has tended to neglect the concerns and needs of Latinos. When the White House

* In this report the terms "Latino" and "Hispanic" are used interchangeably to refer to people who can trace their ancestry to the Spanish-speaking countries of the Americas and the Caribbean. The term "Latino communities" is also used to recognize the perceived heterogeneity among the major Latino national origin populations in the United States. (See de la Garza, et al., 1992.)

Advisory Council on the National Information Infrastructure (NII) was first established, for example, not a single Hispanic was appointed to the Council. Only later did Commerce Secretary Brown invite Eduardo Gomez, president and general manager of Albuquerque's KABQ Radio, to offer advice on the direction of the NII. This report specifically outlines issues of relevance to Latino communities, issues which decision makers can easily grasp and use when making policy.

This report is composed of four main sections, each of which addresses a sector currently being transformed by innovations in information technology. A better understanding of how these transformations affect Latinos can inform the policy debate and ultimately contribute to closing the technology gap between Latinos and non-Latinos.

EMPLOYMENT

What is the relationship between advanced telecommunications technologies, particularly computers, and employment? This section will explore how computer literacy is becoming mandatory in an economy that is displacing labor-intensive, industrial-age work.

EDUCATION

What is the status of America's public schools in preparing Latino children for a technology-dependent society? The current Administration has made it a goal to connect all schools to the Net by the year 2000 in order to develop a more computer literate populace. To prepare all children equally for success in a technology-dependent society, what tasks remain to be performed?

HOUSEHOLD COMPUTERS

Given that only about one Latino household in eight has access to a computer in the home, what is at stake for Latinos as basic information and services are increasingly delivered electronically?

TWENTY-FIRST CENTURY PUBLIC LIFE

Information technology is changing the way in which political transactions occur. How, as a result of telecommunications technologies, will transformations in political communication and the delivery of services and benefits impact Latino communities?

SETTING THE STAGE: WHAT IS THE NII? WHY IS IT IMPORTANT? WHAT DOES IT PROMISE?

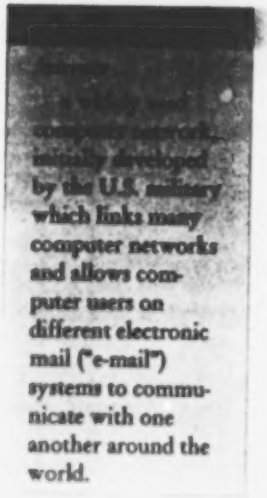
THERE ARE HIGH STAKES for Latinos in gaining access to the vaunted National Information Infrastructure (NII), an emerging communication network known colloquially as the "information highway." What is the NII? The vision for a twenty-first century information infrastructure was laid out in an Administration Council on Competitiveness report in 1993:

> The information infrastructure will enable all Americans to access information and communicate with each other easily, reliably, securely and cost-effectively in any medium—voice, data, image or video—anytime, anywhere. This capability will enhance the productivity of work and lead to dramatic improvements in social services, education and entertainment.

As is clear from this description, the NII is defined in terms of both its technology (e.g., its mode of delivery) and its applications or content. For example, the NII will undoubtedly be multimedia, permitting not only voice transmission, but also full-motion video, data, and image transmission. The technology is also depicted as enabling certain activities. Distance learning, telemedicine, telecommuting, electronic-benefit transfer and a host of other applications are made possible by delivery systems with sufficient bandwidth.[1] However, to reap these benefits, one must have the tools and resources to access this delivery system.

After much ballyhoo over the promise of this NII, its outline is beginning to take shape, principally due to the efforts of the telecommunications industry—local exchange carriers, long-distance companies, cable companies, equipment manufacturers, computer hardware and software providers, and maverick wireless, satellite and cellular consortia. Evidence of the NII's progress was recently collected into a National Telecommunications and Information Administration (NTIA) report. The report,

[1] For a discussion of the advantages of narrowband and broadband networks for service delivery, see *The Cost of Access . . .* (Wilhelm 1995).



by the U.S. military which links many computer networks and allows computer users on different electronic mail ("e-mail") systems to communicate with one another around the world.

using Internet access as a barometer of progress, revealed that 35 percent of K–12 public schools, 22 percent of hospitals and 21 percent of public libraries currently have Internet access (Gonzalez 1995). This report suggests that the information highway has yet to reach most public institutions. The glass is clearly more empty than full, particularly for low-income households and ethnic minorities.

Why devote an entire report to accessing the NII? The introduction of information and communication technologies into society presents new possibilities while also creating obstacles to overcome. The example of the telephone is revealing. It took 100 years from the invention of the telephone in the late 19th century for 90 percent of households nationwide to have a home phone. (Latino and African-American households still have not reached 90%). Households with phones undoubtedly have had greater opportunities than those without—such as greater access to the outside world, to employment prospects, and to emergency information. Widespread use of phones placed new burdens on those who could not call prospective employers or emergency services. As communication scholar Jorge Schement points out, "people without telephones are seen as truly isolated from basic communication." The proliferation of computer networks and other advanced information and communication tools, raises the stakes: broadband technologies offer many more advantages and opportunities such as distance learning, electronic benefit transfer, and telecommuting, services to which some persons may be denied access.

When we think about what drives the new economy, what often comes to mind is the proliferation of advanced technologies, such as computers, which allow for greater efficiency. As the Vice President's *National Performance Review* recently put it, "the history of the closing decade of this century is being written on computer." During the past 15 years, networked computers have become a fixture of society, changing the ways many people shop, work, play, socialize and learn. Without this access, society may be divided into two classes of people: those who can manipulate computers and other cutting-edge tools and those who cannot.

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II THE ROLE OF INFORMATION TECHNOLOGY IN THE EMERGING ECONOMIC ORDER

THE SOCIETY OF THE PAST, in which laborers made and moved goods is being eclipsed by an economy based on the manipulation of symbols, information, and knowledge. By the year 2000, approximately one person in ten in the United States will manufacture and move material, a figure that stood at one in four in the early 1960s (Drucker 1993). A similar story is being written in the agricultural sector. Since the end of the Second World War, about 15 million persons have left farm-related employment. Currently, less than 3 percent of the work force is engaged directly in farming, down from 60 percent in 1850 (Rifkin 1995). Employed persons today are occupying the service sector in growing numbers, a sector whose extremes include, on the one hand, creating value through the innovation and productivity of knowledge and, on the other, serving up hamburgers at the local drive-thru.

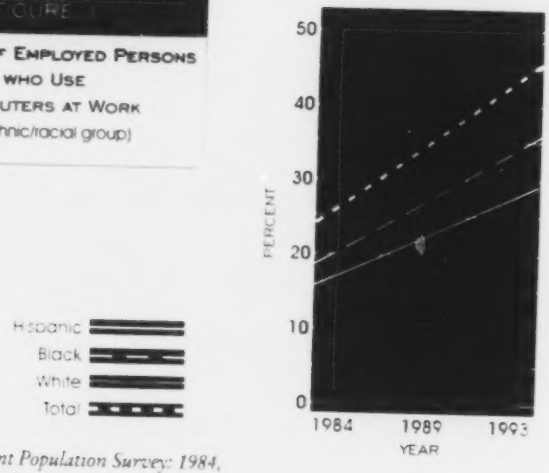
The shock waves this transformation is causing will be felt by all Latino communities. To adapt successfully to such changes, Latinos will need public and private initiatives to support their interests. Effective community, state, and federal level telecommunications policy is required to ensure that all persons have an opportunity to benefit from the communications revolution.

Employed persons today are occupying the service sector in growing numbers, a sector whose extremes include, on the one hand, creating value through the innovation and productivity of knowledge and, on the other, serving up hamburgers at the local drive-thru.

The need for society to invest in human capital—such as universal literacy of a high order—is also critical. Notwithstanding public opinion that calls for a telecommunications policy that benefits all U.S. residents, a concrete universal service policy has not been forthcoming in either the House (HR 1555) or the Senate (S. 652) telecommunications bills in

FIGURE 1

PERCENT OF EMPLOYED PERSONS WHO USE COMPUTERS AT WORK
(By ethnic/racial group)



Source: *Current Population Survey: 1984, 1989, 1993.* US Bureau of the Census

In 1993, only about 1 of every 3 employed Hispanics used a computer on the job, compared to almost 1 of every 2 employed Whites. This gap reflects increasing polarization between society's technology "haves" and "have-nots."

the 104th Congress. Since many of the programs that provide the education and skills that U.S. residents will need to be competitive long term in the global economy are imperiled in the fiscal year 1996–97 federal budget, the need for a prudent and fair policy is all the more important.

One benchmark for clarifying the depth of Hispanic participation in a rapidly changing economic system is computer use on the job. The U.S. Department of Commerce, for example, uses institutional access to advanced telecommunications applications and protocols, such as the Internet, to gauge the NII's momentum. A similar approach reveals that Latinos have not been introduced to computers on the job at the same rate as their non-Hispanic counterparts. In 1993, Hispanics lagged about seven years behind the population as a whole in using computers on the job: 29.3 percent of employed Hispanics used a PC, about the same as the figure for the population as a whole seven years earlier. As figure 1 shows, computer use among Hispanic workers rose more slowly than for all other groups, especially Whites[2]; put another way, the gap in

[2]The terms *Black* and *White* are racial categories from which persons of Hispanic origin have not been excluded: the categories White and Hispanic are overlapping, not mutually exclusive. The effect of this categorization by the Census is a reported computer access and use for White persons that is lower than it would be for *non-Hispanic White* persons. In other words, the gap between Hispanics and non-Hispanic Whites is greater than that shown for Hispanics and all Whites.

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computer use at work between Hispanics and Whites widened substantially during the period from 1984 to 1993.

What are some of the factors that impact whether Latinos use computers at work? TRC's analysis found that one's occupation, education and income were the three most significant variables in predicting Latino computer use at work. (See the Methodology section for an elaboration of the statistical techniques used in this report.) The first two of these factors will be discussed in this section; we will return to a discussion of Latinos and income in section IV.

OCCUPATIONAL STATUS

In terms of occupational distribution, Hispanic males in 1992 were most likely to be employed in low-skilled or semiskilled jobs—for example, as laborers, operators or fabricators, jobs that comprise a shrinking sector of the economy. Many of these jobs are vulnerable to obsolescence at the hands of new technologies. TRC's statistical analysis revealed that Latinos employed as laborers, operators or fabricators are less likely to use computers at work than their white-collar counterparts for all occupational groups. The next largest

Most jobs today require that employees be computer literate. In order to compete for the high-wage jobs of the future, Hispanics must develop the skills in manipulating information technology that are part and parcel of the post-industrial economy.

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occupational sector in which Hispanic males are employed—precision production, craft and repair—however, tends to consist of high-tech, high-wage environments in which many Latinos have benefited from running computer programs such as CAD-CAM.

Employed non-Hispanic White males were more likely than their Hispanic counterparts to be in managerial and professional specialty occupations (29.2%), jobs which tend to include the manipulation of computers as part and parcel of their work environment. Those Latinos who occupy either managerial or technical positions are two and three times more likely, respectively, than Latinos in all occupational groups to use computers at work. (See table 4.) The same story can be told about females as well, with 30.9 percent of non-Hispanic White females employed in managerial and professional specialty occupations compared to 15.4 percent of Hispanic females.

When one analyzes longitudinal data on employment, it is clear that over the past decade Hispanics have not experienced a high rate of occupational mobility in moving up to jobs in which using computers would be a likely component of the work environment. Between 1983 and 1993, for example, the percent of Hispanic males employed in managerial and professional specialty occupations remained constant at 11.6 percent. For non-Hispanic males, there was an increase over the same period from 26.3 percent to 27.9 percent. The reasons for these phenomena are no doubt complex, but one cannot ignore recent data released by the Glass Ceiling Commission (1995) and the Tomás Rivera Center (1995) suggesting that a "glass ceiling" remains, preventing women and ethnic/racial minorities from being promoted to managerial and professional levels. The lack of inclusion at the managerial levels may account in part for the slow increase in computer utilization on the job for Hispanics relative to the employed population as whole.

EDUCATIONAL ATTAINMENT

The 1992 national dropout rate among Hispanic 16- to 24-year-olds, according to the U.S. Department of Education, was 29.4 percent, a figure about four times higher than that for non-Hispanic Whites (7.7%). Those

young persons who leave school prematurely typically enter the work force at the low-skill, low-wage end of the occupational spectrum, if they find jobs. Hence, educational attainment and occupational status are highly correlated. Many of these jobs, moreover, neither require nor offer the sort of continuous education and training that employees will need to stay competitive in an era of government and business downsizing and streamlining. A likely result of insufficient educational attainment and employment in "dead-end" jobs is technological obsolescence and impending unemployment. One scenario may be depicted as consisting of the five stages listed below.

A Downward Spiral

STAGE 1 low educational/vocational attainment
↓
STAGE 2 semiskilled occupational status
↓
STAGE 3 low rate of re-learning/re-training
↓
STAGE 4 potential technological obsolescence
↓
STAGE 5 lower status employment or unemployment

The "have-not" predicament in which many persons find themselves in a technological society is by no means inevitable. Greater investment in universal literacy and human capital on the part of the private and public sectors can reverse the trend toward a two-tiered society, split between information rich and poor. Universal literacy refers not only to reading, writing, and arithmetic, but also to the manipulation of computers. Increasing human capital means cultivating the unique talents and experience of a diverse population. There are positive signs in that Hispanics on the whole are more educated today than they were ten years ago, particularly in terms of high school and college graduation rates. Entrepreneurship is also on the rise as Hispanics seize the opportunities that the new economy presents. The downward spiral to which we have alluded can be reversed if employers, schools, families, government and other institutions take care to provide persons with the necessary resources and skills to succeed in the labor market of the future.

III GATEWAYS TO THE WORLD: TWENTY-FIRST CENTURY SCHOOLHOUSES

PRESIDENT CLINTON, in his 1994 State of the Union Address, proclaimed that "we must work with the private sector to connect every classroom, every clinic, every library, and every hospital to a national information highway by the year 2000." Although the linking of these institutions remains in its early stages, Internet access in K-12 schools, as well as hospitals and public libraries, is on the rise (see Gonzalez 1995). The *Goals 2000: Educate America Act*, signed into law in March 1994, advances the use of technology to promote the achievement of National Education Goals (section 231). A priority of the legislation is to ensure ease of access to emerging technologies so that no community will be excluded from the technological revolution.

Notwithstanding these laudatory goals, a recent report prepared for the U.S. Office of Technology Assessment (OTA) points out that Hispanic students attend schools with fewer-than-average computers per capita than their Anglo counterparts (Becker 1994). Using data from the 1992 IEA Computers in Education Study, this report reveals that nationwide the average Hispanic student's school has 19 percent fewer computers per capita than the average student's school. Moreover, when schools are evaluated in terms of the involvement of students in manipulating computer networks for communication, including using electronic

When schools are evaluated in terms of the involvement of students in manipulating computer networks for communication, including using electronic mail, the average Hispanic student's elementary school uses advanced tools 40 percent less frequently than the average student's elementary school.

A young girl develops the computer skills that will increase her chances of succeeding in a competitive, technology intensive economy. The school represents the principal venue through which Latinos learn vital computer skills that they will probably not acquire at home. Yet, for every Latino school child who uses a computer in school, there is still one who does not.

mail, the average Hispanic student's elementary school uses advanced tools 40 percent less frequently than the average student's elementary school.

Another OTA report, *Teachers & Technology: Making the Connection*, states that by spring 1995, 5.8 million computers were available and being used for instructional purposes nationwide, about one computer for every nine students. About three out of four public schools have access to some type of computer network and one in three has access to the Internet. Although it is noteworthy that there has been an 18 percent rise in the total number of computers in schools over the past three years, these numbers tell only part of the story.

First, there is a wide difference in computer *density* between predominantly Hispanic schools and non-Hispanic schools. Second, counting raw numbers of computers does not indicate *meaningful* access or use. To be useful, computer instruction must be integrated into curricula (either vocational or instructional); teachers must have the time to learn new applications; and students must have adequate

exposure to high quality computer instruction. In order to measure how salutary a technology-enhanced education is, we need a more comprehensive understanding of access, one that considers both the number of computers in the school and the human infrastructure, computer components, support structures and organizational arrangements which determine the quality of access that students and teachers can experience. Table 1 illustrates the difference between two schools with the same enrollments and number of computers, but one offers more meaningful access (school B) than the other (school A).

As shown in figure 2, for every Hispanic child who uses a computer in school there is

TABLE 1
FEATURES OF MEANINGFUL COMPUTER ACCESS

ASPECTS OF MEANINGFUL ACCESS	SCHOOL A	SCHOOL B
Equipment	50 computers	50 computers
Type of Computers	computers with: low memory; low speed; lack of replacement parts; no new software; no graphics programs	computers with: high speed; adequate replacement parts; innovative software; multimedia capabilities
Software	English only	language sensitive
Student - Computer Ratio	1 computer for every 20 students	1 computer for every 7 students
Connectivity	neither LAN/WAN nor Internet	both LAN/WAN and Internet
End-User Support	user support from district	on-site user support
Placement of Technology	laboratory	in the classroom
Time	1/2 hour per week access	daily access
Infrastructure	insufficient outlets; no outside telephone line; no air conditioning	sufficient outlets/amperes; outside connectivity; air conditioning
Preservice and Inservice	voluntary, ad hoc teacher training from county or district	site-based training of teachers and staff
Administrative Support	at worst, administrator is technology averse; at best, perceives more pressing needs than technology	technology-friendly administrator amenable to spending scarce resources on capital-intensive technologies

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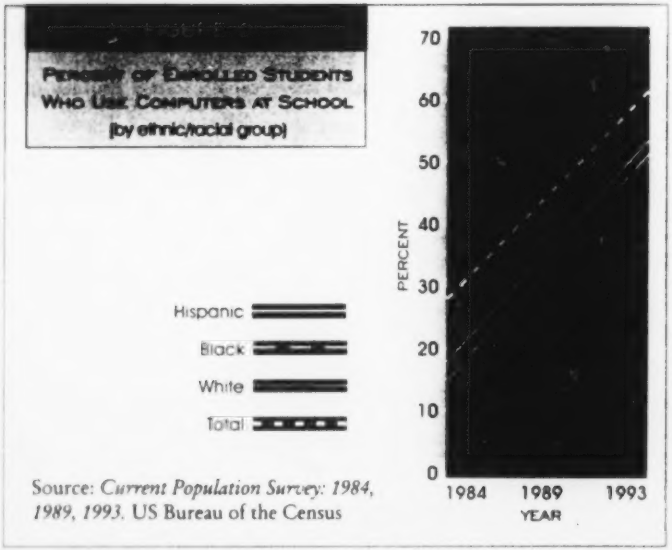

Source: *Current Population Survey: 1984, 1989, 1993.* US Bureau of the Census

Although Hispanic students are less likely than all enrolled students to use a computer at school, the rapid increase in computer use among Hispanics means that America's schools remain the gateway through which many Hispanics will gain exposure to and familiarity with computers.

one who does not—whereas three out of five Anglo school children use computers. In the last decade there has been a marked increase in the number of Latino students who have access to a computer. In 1983, only 18.2 percent of 3- to 17-year-olds who were enrolled in school used a PC. By 1993 that figure had nearly tripled, rising to 52.7 percent.

The rate of increase in computer access in the schools for Hispanic students has been brisk. Such a high rate of school computer use, when compared to household access (see next section), reveals that public schools are perhaps the central gateway through which Latinos can become full participants in the information society. The rate of increase in Latino children's use of computers in school, for example, has risen at the same rate as the population as a whole. Nonetheless, as figure 2 shows, the level of computer use by Latino

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Schools, as well as other public access points, can offer those who cannot afford a computer and a modem the opportunity to access the information highway.

Schools vary widely in the quantity and quality of computer-mediated instruction they offer to students. The TRC found a significant difference between school computer use by Latino children and their non-Latino counterparts.

students is still about eight percentage points less than that of the total student population, a statistically significant difference.[1] Clearly, there is a long way to go before the goal of wiring all schools by the end of the millennium is realized, particularly for Latino and Black students, who seem to be about four years behind their Anglo counterparts.

[1] To determine whether differences in categories [computer use in school (yes/no) x ethnicity (Latino/non-Latino)] are statistically significant, a Chi-Square test was performed, a procedure explained in the Methodology section of this report. Significant differences were found in using computers at school between Latino children and non-Latino children enrolled in school.

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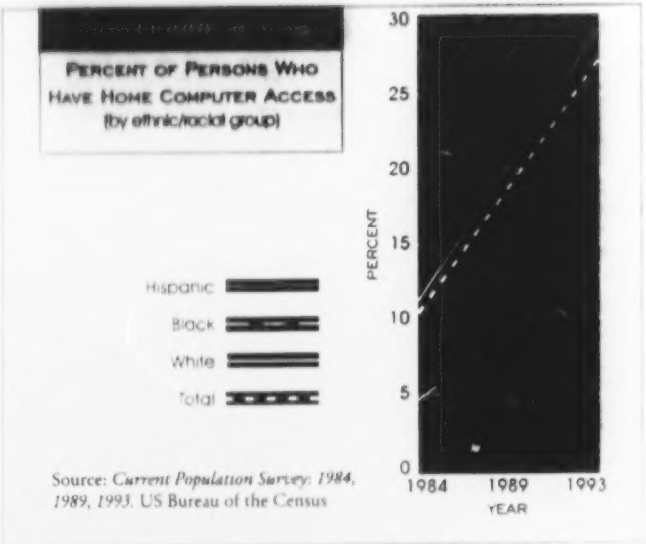
IV LATINOS AND HOME ACCESS: A COMPUTER OF ONE'S OWN?

ANALYSIS OF COMPUTER access in households points to the greatest gap between Latinos and non-Latinos. As figure 3 shows, in 1993, slightly over one Latino in eight (12.7%) could access a PC in the home, a figure that has risen slightly, to 13.1%, according to the November 1994 Current Population Survey.[1] Meanwhile, the figure for non-Hispanic Whites was greater than one in four (28.9% in 1993; 28.6% in 1994). This gap actually widened significantly between 1984 and 1994. As the household becomes more of a locus for electronic benefits and services, such as information retrieval and communication applications, Latino families will be less well-positioned to take advantage of these benefits unless they have the tools to access them.

The current policy debate has focused on developing public access points at schools,



Only 13 percent of Hispanics own a home computer. If computers are going to be integral components of 21st century life, as so many persons believe, then this paucity of access must be ameliorated. One means of accomplishing this could be through information campaigns aimed at Latino consumers that illustrate the usefulness and value of computers for everyday life.

[1] See the Methodology section of this report for a detailed explanation of the Current Population Survey (CPS).

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community centers, libraries, hospitals and city halls to ensure that all U.S. residents have access to the emerging NII (Gonzalez 1995). The logic behind this approach is sound: because low-income and minority communities will not have computers of their own in sufficient numbers in the near term, they will need these public access points to make electronic transactions.

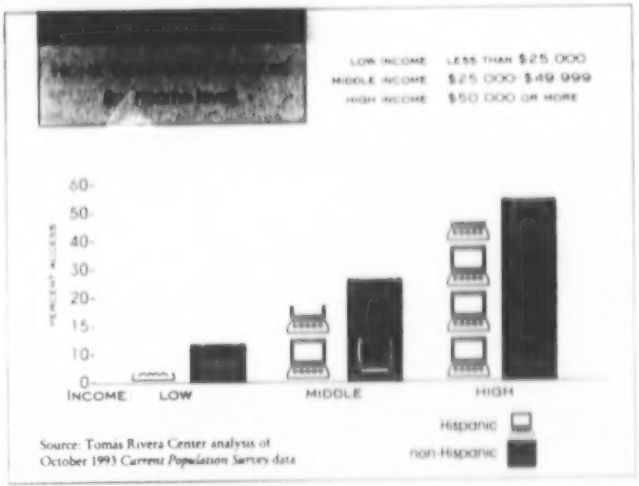
While such an approach is prudent, the push to provide universal and affordable access to emerging technologies in the home should not be neglected. After all, these two strategies of networking public institutions and linking homes to the outside world are not mutually exclusive enterprises. Franchise agreements in the cable industry and cross-subsidization in the telephone industry are only two ways in which public and private goods have been balanced in order to provide a public right-of-way to what is rapidly becoming a wholly privatized digital spectrum. To adjust to the new regulatory framework, stakeholders need to find innovative ways to link private and public infrastructure development to ensure that no household is excluded from basic access to the emerging information network.

Relying primarily on public points of access as the fulcrum for universal service has many potential drawbacks. First, in terms of quantity of service, public access points such as libraries and schools are not open twenty-four hours a day; indeed, the trend in many cities and states is toward ever-diminishing access to libraries, schools and community centers as a result of budget shortfalls. Second (and also a consequence of budget shortfalls), cities, counties and state governments have tended to reduce staffing and other labor-intensive services which frequently diminishes the quality of service to the community. The tendency in the 1990s is for leaner government—and one manifestation of this trend in current policy discussion is cutting what we are calling the human-capital improving institutions. By many accounts, the implication for low-income, minority communities is waning access to necessary services.

The statistical analyses conducted for this study demonstrated that the two best predictors of home computer access are

income and educational attainment.[5] With a 1992 median income of $23,912, the typical Hispanic family's income was only 62.9 percent of a non-Hispanic White family's—$38,015. Furthermore, slightly more than one in two Hispanics age 25 and older have at least graduated from high school (53.1%), compared to 82.4 percent for their non-Latino counterparts. Clearly, relative to non-Latinos, Latinos possess fewer of the resources and skills to participate fully in a capital and knowledge intensive society.

As figures 4 and 5 reveal,[6] when income and educational attainment are held constant (e.g., when we look at Latino and non-Latino computer owners in the *same income group*), there is still a significant difference between the

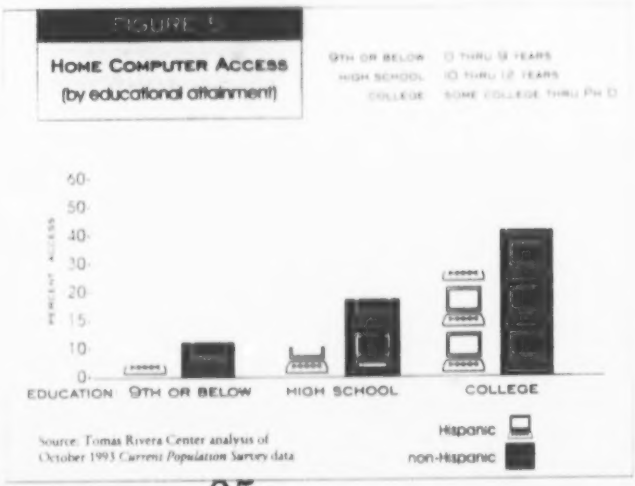


Source: Tomas Rivera Center analysis of October 1993 *Current Population Survey* data

By many accounts, Hispanics have lower rates of computer access as a result of lower socioeconomic status. However, when we look at Hispanics and non-Hispanics within the same income and educational attainment categories, Hispanics are still less likely than their counterparts to have access to computers at home.

FIGURE 5

HOME COMPUTER ACCESS
(by educational attainment)



Source: Tomas Rivera Center analysis of October 1993 *Current Population Survey* data

[5] For details on statistical analysis of home computer access using logistic regression analysis, see discussion in the Methodology section of this report, table 5 in particular.

[6] A Chi-Square test was performed to determine whether observed differences between Latinos and non-Latinos in the respective groups are significant. The only income category for which there was no significant difference between Latinos and non-Latinos on home computer access is $75,000 and above. See the Methodology section for further discussion of this procedure.

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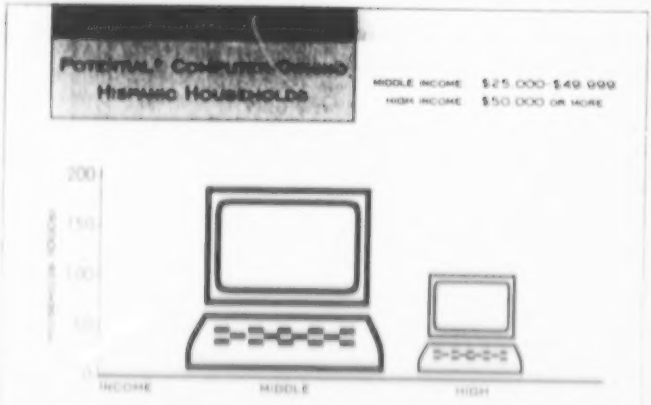

*Hispanic households with potential computer access are those that would have computers if their rate of access were the same (others purchase) as for non-Hispanic households in the same income category.

Source: Tomás Rivera Center analysis of October 1993 Current Population Survey data

Hispanic consumers represent an untapped market for computer hardware and software companies. Upwards of 300,000 potential customers with significant purchasing power could expand the computer market by more than a half billion U.S. dollars if these middle and upper income Hispanics were to acquire computers at the same rate as their non-Hispanic counterparts

two groups for each income category (figure 4) and educational level (figure 5).

These statistics tell us that even if income and education levels were comparable between Hispanic and non-Hispanic families, the former would be less likely than the latter to own a home computer. Indeed, even when we control for income, education, occupation and age, a non-Latino is one and a half times more likely than a Latino to have access to a home computer. (See Methodology, table 5.)

What is clear is that as costs come down for computers and computer components, more Latinos will be likely to acquire them. (Still, as figures 4 and 5 indicate, Latinos will not buy as many computers as non-Latinos, regardless of their income level.) Figure 6 suggests that nearly 300,000 Latino customers (middle and high income combined) would be computer users if they purchased computers at the same rate as their non-Hispanic counterparts. This gap in computer ownership in the

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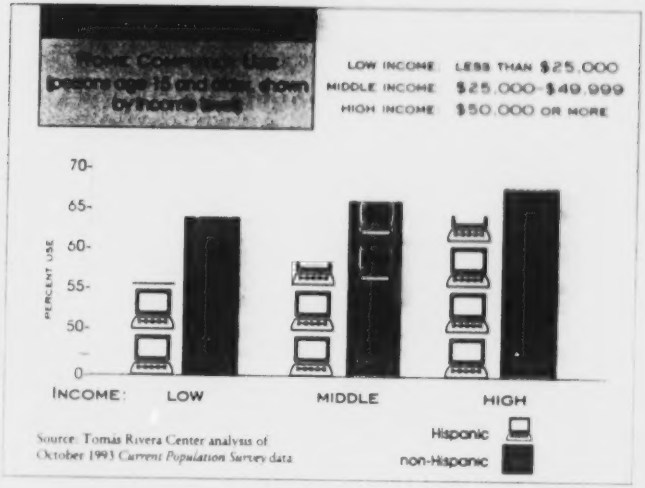
Latino community amounts to a missed opportunity, since the prospects for success in the new economy are so severely curtailed without benefit of computer literacy. In addition, these prospective customers constitute an untapped market for the computer hardware and software industries in the $600 million range (assuming an average computer purchase of $2,000).

The gap in computer ownership in the Latino community amounts to a missed opportunity, since the prospects for success in the new economy are so severely curtailed without benefit of computer literacy. In addition, these prospective customers constitute an untapped market for the computer hardware and software industries in the $600 million range (assuming an average computer purchase of $2,000).

The factors that separate Latinos who do not purchase and use computers from those non-Hispanic persons with similar education and income who purchase and use computers are still unclear. The data are sketchy on the non-economic and non-educational factors that influence computer access. Certainly, acquiring computer technology is a two-way process. The customer must be able and willing to pay for a product and for service, and the vendor often must provoke interest in a product by advertising to certain customers. Niche marketing to Hispanic customers, for example, would be one way to generate demand for advanced technologies. With so many potential computer users, manufacturers of computer hardware, software and the like, as well as the Latino community, need to shed light on what influences Latino consumers' decision-making concerning the purchase of advanced communications technology.

When we examine the habits of only those individuals who own a computer, we find many more similarities than differences between Latinos and non-Latinos in home computer use. In general terms, ethnic differences do not tend to be determining factors in



The gap in computer use between Hispanics and non-Hispanics is less dramatic than the figures for computer ownership. There is no statistical difference in computer use, for example, between an upper-middle class Hispanic household and a non-Hispanic household.

explaining computer use. As figure 7 indicates, the gap in computer use between Latinos and non-Latinos in low and middle income categories (8.8% and 7.5% respectively) is statistically significant, but the gap between high income Latinos and non-Latinos (3.4%) is not.[7] Further analysis indicates that ethnicity is not significant when we control for age, education, income, occupational status and sex (see Methodology, table 6). What is clear is that socioeconomic status explains whether one has access to a computer better than it does computer use. For example, when socioeconomics are held constant—along with age, sex, and occupational status—Latinos are no less likely than non-Latinos to use a home computer.

When modem ownership is examined, the likelihood of a user having such hardware

[7] When a Chi-Square analysis was performed to look at home computer use of Latinos and non-Latinos while controlling for income, the following results were obtained:
Low income: n = 4,309, p = .01215
Middle income: n = 8,755, p = .00575
High income: n = 12,738, p = .18716
df = 1, p≤ .05

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TABLE 2

USES OF HOME COMPUTERS*

(Persons Age 3 to 17 Years)

PERCENT OF GROUP USING COMPUTERS FOR EACH APPLICATION

GROUP	GAMES	SCHOOL ASSIGNMENTS	WORD PROCESSING	LEARN COMPUTERS	EDUCATIONAL PROGRAMS
Hispanic	68.4	44.7	25.1	24.8	22.2
Black	69.4	49.5	22.0	36.2	39.5
White	70.7	47.3	31.5	22.8	30.9
Total	70.3	47.4	30.9	23.7	31.5

*Percentages for computer applications are derived only from home computer users. Respondents could name more than one purpose for which they use home computers.

Source: *Current Population Survey*, October 1993 U.S. Bureau of the Census

for linking the user to the information highway does not vary greatly as a function of ethnicity. The November 1994 CPS data reveal that the differences in modem ownership among computer-owning White non-Hispanic (46.1%), Black non-Hispanic (40.2%), and Hispanic (42.3%) households was not significant.

The uses to which people put computers does not diverge significantly as a function of ethnicity, either. For the five most common purposes of computer use at home, broken down into use by children (age 3 to 17 years) and adults, the differences by ethnicity are insignificant, except for one category. Clearly, as table 2 shows, there is a fairly wide gap between Hispanics age 3 to 17 and all persons in this age group relative to use of educational programs, but the difference in the other four categories of computer applications does not exceed five percentage points in any one category. A similar pattern holds true in the adult population. Table 3 (see next page) shows a difference of more than five percentage points between Hispanics and all adult persons who use computers only in word processing.

TABLE 3

USES OF HOME COMPUTERS*
(Persons Age 18 and Older)

PERCENT OF GROUP USING COMPUTERS FOR EACH APPLICATION

GROUP	WORD PROCESSING	SALES	WORK AT HOME	LEARN TO USE	HOUSEHOLD RECORDS
Hispanic	55.2	34.8	25.5	24.9	19.8
Black	51.4	32.4	25.0	28.0	18.8
White	62.1	35.4	28.8	20.1	18.3
Total	61.5	35.0	28.4	20.6	18.1

*Percentages for computer applications are derived only from those who use home computers. Respondents could name more than one purpose for which they use home computers.
Source: *Current Population Survey*, October 1993 U.S. Bureau of the Census

The broader picture emerging from this analysis of home access and use is that the differences in computer access between Hispanics and non-Hispanics are significant, even after controlling for education and income. However, the portrait of computer use, modem ownership and computer applications is less clear. There are differences between low and middle income Hispanics and non-Hispanics in terms of computer use, but higher income groups experience no significant difference in use (cf. U.S. Department of Commerce 1995). Also, when income, education, age, occupational status and sex are held constant, there is no difference between Latinos and non-Latinos in terms of computer use in the home. The greatest barriers to Hispanic participation in the NII appear to be low income, which makes purchasing computers difficult, and low educational attainment, which reduces the chance that Hispanics will find value in acquiring these tools. Once a computer is acquired, the ethnic differences diminish substantially. In order for Latino families to acquire not only the computers but also the connections to the NII, several events must converge, including: assuring that telecommunications policy preserves and extends universal service; developing structures that motivate infrastructure investment in low-income neighborhoods on the part of industry; and, increasing ownership and control of telecommunications and media outlets on the part of Hispanic firms.

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V LATINOS AND PUBLIC LIFE IN THE AGE OF INFORMATION TECHNOLOGY

ONE EMERGING CHANNEL of political discussion is online forums, a way of communicating and sharing information whose currency has dramatically increased over the past several years. By the close of 1994, nearly 30 million subscribers could exchange electronic mail on the Internet, and one estimate forecasts 90 million users by the end of the century (Civille 1995). Although civic networking has only recently reached critical mass in Latino communities, this mode of interaction is evolving into an important public space. According to the Center for Civic Networking, for example, the NII, if properly designed and universally accessible, could revitalize civic institutions and public debate. Through this electronic medium, Latino communities, building on models such as LatinoNet and ChicanoNet, can share in the online policy dialogue, articulating a voice and mobilizing constituents.

In addition to civic networking, information technology is also being used to bring services and benefits to residents. The recent impetus to "reinvent government"—to streamline bureaucracy and make it more responsive to the needs of society—has prompted policy makers to examine how information technology can be used to deliver services to the public more cheaply and efficiently through

Information technology is fast becoming an integral part of public life, touching the lives of young and old alike.

electronic benefit transfer (EBT). The government stands to significantly reduce benefits delivery cost, since it costs 6 cents per electronic transaction compared to 36 cents per physical paper transaction (*National Performance Review* 1993).

Both federal and state entities currently deliver services electronically, such as monetary and inkind benefits, grants and contracts, training and education, as well as general information on what services are available and how they can be delivered (see OTA, *Making Government Work*, 1993). Many cities, moreover, are experimenting with public information utilities that allow residents with a modem (or those who patronize community centers and libraries) to communicate with city hall and to access a host of government information resources. The Office of Management and Budget (OMB) estimates that by the year 2000, approximately 75 percent of public transactions will be processed electronically.

The transition to electronic services is in full swing, and Latino communities must be made aware of the potential benefits of receiving services and benefits more efficiently. Some state human service departments are already discarding paper benefits, such as food stamps, and moving toward electronic delivery through a "smart card." More than six million Hispanics have received public assistance at one time or another, and new ways of delivering these services can be improvements if and only if Latinos gain meaningful access to the delivery system. If services are transferred electronically in the near future and low-income recipients do not have access to these technologies, then the unintended consequence may well be the widening of the gap between "haves and have-nots." Although three out of four public transactions will be electronically processed by the year 2000, it will take universal, affordable access to continually advancing telecommunications and computer networks to permit full participation by all members of society.

Of course, as has been stressed throughout this report, having access to the technology needed to access services is necessary but not sufficient. Latinos must also have the resources and skills to use these services.

VI SUMMARY OF RESEARCH FINDINGS

WHAT THIS REPORT shows is that the gap in computer access between Hispanics and non-Hispanics can be explained in part by a person's income level, educational attainment, occupational status, age, ethnicity, gender and race. Put simply, it is difficult, to say the least, for a person living at or below the poverty level to buy a computer, just as it is unlikely that a person with an elementary school-level education will possess the know-how to manipulate a computer. In putting forth this model of participation in the NII, we are suggesting that gaining literacy in computers is contingent upon among other things having a threshold income, education, and occupational level to access the NII. What remains to be explained is why, after we control for a host of variables, Latinos still experience lower levels of computer access than do non-Latinos.

Resolving to make Latinos full participants in the information economy is critical. This goal is greatly enabled by data analysis of computer access patterns across variables, including race, ethnicity, income, and educational attainment. Examining the longitudinal data from 1984 to 1994, as well as a close statistical analysis of the 1993 Current Population Survey, the TRC can begin to paint a picture wherein one's resources—income,

The training of personnel who in turn mentor others is critical in helping to assure that all persons share in the benefits that information technology can bring.

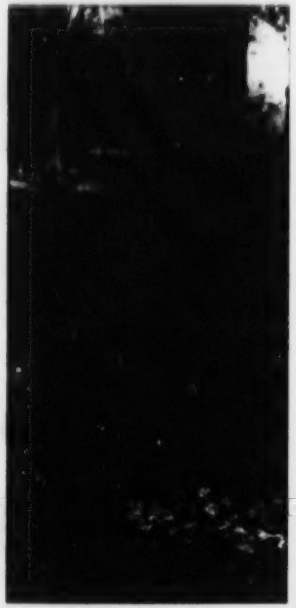
educational attainment and occupational status—predict whether one is likely to be linked to the NII. However, the TRC's research also shows that when these and other variables are held constant, Latinos are still less likely than non-Latinos to experience computer access both at home and on the job. At all income levels, Hispanics are significantly less likely than their non-Hispanic counterparts to have a computer in the home. In terms of computer use, however, our analysis discovered that Latinos are no less likely than non-Latinos to use a home computer when income, education, occupational status and age are held constant.

The dawn of the post-industrial epoch presents many opportunities and challenges to Latino communities across the country. On the one hand, information technology can empower communities. The high cost of access to the NII, on the other hand, represents a significant obstacle to Latino participation in the new economy. A truly effective and just policy in this arena is attentive to both sides of the technology divide, "haves" and "have-nots" alike. If policy makers and industry spokespersons tout only the promise of emerging technologies without putting mechanisms in place to attend to their pitfalls (e.g., displacement, technological obsolescence, marginalization, the widening gap between "haves" and "have-nots"), then those without the resources to get connected will be relegated to second-class status, unable to participate in twenty-first century political, economic and social life.

VII POLICY RECOMMENDATIONS AND CONCLUSIONS

WITH THE RESULTS of this report, policy makers, particularly those who represent Latinos, have the tools to begin to make a case for policies that could diminish the gap between technology "haves" and "have nots." Given the high cost of computer hardware, software and connectivity, low-income households are prevented from accessing the tools that, as was suggested at the beginning of this report, represent the keys to the vault of the NII. Because Latinos are disproportionately poor, less likely to attain a formal education, and more likely to occupy jobs that are susceptible to obsolescence, they face stiff challenges on the road to full participation in society.

With the stakes so high for Latinos in the changing economy, the TRC offers the following policy recommendations. Although it is true that private/public partnerships represent the most viable way to implement policies such as those suggested below, for clarity of presentation, the TRC has divided its recommendations into the following sections: (1) governmental; (2) private/corporate; and (3) the so-called third sector, which includes philanthropic and non-profit organizations.



Information technology is a great enabler, allowing persons the ability to perform tasks more efficiently. The portability of today's computers and the introduction of wireless modems permit this student to access the information highway from a "low-tech" location.

Although the development of the National Information Infrastructure is largely market-driven and privately financed, the new regulatory framework emerging in the current Congressional session retains a necessary (although probably insufficient) role for the federal government. The following recommendations are key to ensuring that no communities in the United States are without the benefits of an advanced communication network.

1 TRC's analysis of CPS data reveals that it is not sufficient to measure connectivity to the NII solely in terms of quantity of computer access. The resource model of technology access developed in this report is a start but cannot explain many specific obstacles that prevent persons from experiencing a richer information and communication environment. What explains, for example, why Latinos in all income categories below $75,000 experience a significant gap relative to their non-Latino counterparts in computer access and use in the home, even when income and education are held constant?

Given the paucity of in-depth research concerning why the "have-nots" are stymied in their attempt to access information technology, the U.S. Department of Commerce, perhaps the National Telecommunications and Information Administration (NTIA), ought to support research to shed light on what specific obstacles prevent certain persons from participating fully in the information revolution. This research can inform policy makers as they strive to overhaul telecommunications laws.

2 This report emphasizes that America's public schools provide the gateway through which many underserved and underprivileged children and adults can succeed in the competitive global economy. Low-income and minority children are twice as likely as their counterparts to use a computer for the first time in the school rather than at home. Many parents are being exposed to computers via outreach and mentoring pro-

grams, often conducted by their own children in before- or after-school programs.

It is imperative, therefore, that programs such as *Goals 2000, Improving America's Schools Act*, the Commerce Department's TIIAP grants, and the Education Department's Challenge grants be maintained. These programs are designed to address, among other things, the imbalance in public school access to emerging technologies while challenging institutions to work with the private sector to leverage funds and to establish partnerships so that government seed or start-up monies can cultivate sustainable technology applications in the schools.

3 The U.S. Department of Education should conduct or sponsor research that examines the feasibility and applicability of using educational software developed and/or used in predominantly Spanish-speaking countries to enhance the educational experience of limited-English-proficient U.S. school children.

4 This report suggests that while U.S. universal service policy is coming together around the notion of public access points to advanced services, the push to ensure service to the home should not be ignored. After all, the gap in access to home computers between Hispanics and non-Hispanics has grown over the past ten years, and currently only one Hispanic household in eight has access to a home computer compared to one in four non-Hispanic households.

Those responsible for defining, implementing and enforcing the "new paradigm for universal service"—including the U.S. Congress, the Federal Communications Commission, and the Federal-State Joint Board—should devise mechanisms by which the providers of advanced communications technologies will not bypass low-income and minority communities. These could include select incentives for industry to invest in low-income and rural areas, the expansion of the Universal Service Fund, and the adoption of anti-redlining language to deter the building of the NII solely in more affluent neighborhoods.

[redacted]

Over the past decade, many states have developed new regulatory frameworks that renegotiate the relationship among regulators, industry and consumers. In making transitions to less regulated environments, states are examining various approaches to best serve their residents.

5 State agencies should ascertain the state of technology development in their respective areas to ensure that the information and telecommunications needs of Latinos are understood. In particular, state agencies in the nine largest Latino states—California, Texas, Florida, New York, Illinois, Arizona, New Jersey, New Mexico and Colorado—should assess how to improve Latino residents' access to advanced technology applications, services that can reinvent state government while more efficiently and effectively serving an array of essential information and communication needs.

6 Local educational agencies, when they report data on computer access, should include indicators that probe the quality of this access, including factors such as the age of the computers, the size of their memory, and their networking and Internet capabilities.

[redacted]

As the largest sector of the U.S. economy, the telecommunications and media sectors are building the infrastructure and creating and repackaging the content on which the emerging post-industrial, information society is based. As the primary architects of the market-driven information highway, those in the corporate sector will make decisions that affect the way in which this network meets the needs of the most vulnerable in our society.

7 The best predictor of computer access is a person's socioeconomic status. Individuals without the money to acquire information technology, and without

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the information and knowledge to see the value of computers, are unlikely to be computer users. What this report shows, however, is that when we examine Latinos and non-Latinos in the same income and education categories, there is still a significant gap in computer access, with Latinos less likely than non-Latinos to have this access. The data show that 300,000 more middle and upper income Latino households would have access to computers if the percentage of Latinos with computers were comparable to that for non-Latinos.

Private sector telecommunications companies should move toward understanding the dynamics of a vast, untapped market—Latino communities—in order to expand their customer bases while simultaneously closing the gap in technology access. For example, software and hardware companies should look at the particular needs of their Hispanic market in order, through advertising, to spur demand for products (e.g., Spanish-language software) that Latinos may well prefer as consumers.

8 Software and hardware firms should advertise via Spanish-language print and electronic media to reach a growing and untapped market.

9 Spanish language print and electronic media should conduct education and information campaigns, informing their audiences to the importance of investing in viable information technologies to improve their prospects in the information society.

10 Hispanic leaders and Hispanic Chambers of Commerce ought to support events in the community that increase awareness about information technology and its importance in education, employment and overall literacy in the new economy. Computer fairs can mix education and fun, alerting Latino children and adults, particularly parents, to the growing importance of understanding computers to full participation in a technology-dependent society.

The third sector is a growing segment of society in which philanthropic and non-profit organizations carry on vital tasks. This sector plays a significant role in ensuring that the public is well-informed about telecommunications-related issues that will affect people's daily lives.

11 The philanthropic community should, in considering the fact that Latinos are the fastest growing ethnic group in the U.S., fund research and demonstration projects aimed at technology planning and development in Latino communities.

12 Public Service Announcement (PSA) campaigns should be conducted focusing on the importance of Latino children using information technology as a learning tool to gain valuable computer literacy. PSAs should also direct their message to parents, to relay the value of computers for daily life.

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VIII METHODOLOGY

THE CURRENT POPULATION

Survey (CPS) is an ongoing monthly survey of approximately 55,000 households, compiled and published by the U.S. Bureau of the Census. For its analysis of trends in computer use, the TRC relies on 1984, 1989 and 1993 CPS data in which respondents, children and adults, were asked about computer access and use in the home, on the job and at school. The TRC has also recently obtained data on computer and modem ownership from the November 1994 CPS, data from which the Commerce Department recently released its report, *Falling Through the Net*.

Since the CPS data hitherto published has been exclusively single variable formulations of computer ownership, analysis was limited. Therefore, the TRC purchased the October 1993 CPS on CD-ROM and has been able to conduct multivariate analysis including Crosstabulations, Chi-Square Tests and Logistic Regression Analysis.

CROSSTABULATIONS

A crosstabulation is a table displaying the number of cases (or percentages) falling into each combination of the categories of two or more categorical variables. For example, crossing whether or not one is Latino with whether or not one has access to a home computer yields four boxes with information about each combination. Some of the figures in this report also cross variables while holding others constant such as education and income. For example, by holding income constant, we can examine tabulations of respondents with computer access in a certain income category.

CHI-SQUARE TESTS

Since crosstabulations do not say what proportion of cases to expect in each group, a statistical technique known as the Chi-Square (χ^2) Test is used to test hypotheses about the proportion of cases falling into several mutually exclusive groups. For example, the Chi-Square distribution will calculate whether the

counts in each box (e.g., the number of Latino home computer owners) diverge significantly from what would be expected by chance.

LOGISTIC REGRESSION ANALYSIS

The logistic regression model is used for estimating the probability that an event will occur when the dependent variable, or the phenomenon we are trying to explain (e.g., in our case, computer access), is dichotomous and categorical (e.g., you either have a computer or you do not). The regression coefficients can be interpreted as the change in the log odds associated with one unit change in the independent variable. The coefficent for Latino in table 5, for example, is 1.5839, which means that when we move from Latino status to non-Latino status and the values of the other independent variables remain the same, the odds of accessing a home computer increase by a factor of 1.5839. Since log odds (first column, identified as B) are difficult to interpret, they can be translated into odds by e raised to the power of the coefficient B. The probability of an event occurring then equals:

(Prob [event]/Prob [no event]), or $1/1 + e^{-}$.

TABLE 4

LOGISTIC REGRESSION ANALYSIS OF LATINO COMPUTER USE AT WORK

VARIABLE	B	S.E.	WALD	DF	SIG	R	EXP(B)
AGE	-.0162	.0044	13.4824	1	.0002	-.0563	.9839
CHILDREN	.0552	.0504	1.2013	1	.2731	.0000	1.0568
EDUCATE	.1862	.0229	66.1599	1	.0000	.1330	1.2046
HOUSE	-.0928	.0400	5.3925	1	.0202	-.0306	.9114
INCOME	.0171	.0025	48.2811	1	.0000	.1130	1.0173
OCCUPATI			305.5885	3	.0000	.2874	
OCCUPATI(1)	-.9445	.1057	79.8198	1	.0000	-.1465	.3889
OCCUPATI(2)	-.8256	.0878	88.4489	1	.0000	-.1544	.4380
OCCUPATI(3)	1.0882	.0778	195.7685	1	.0000	.2311	2.9690
REGION			7.5454	3	.0564	.0206	
REGION(1)	-.2479	.1020	5.9096	1	.0151	-.0328	.7805
REGION(2)	.0266	.1316	.0410	1	.8396	.0000	1.0270
REGION(3)	.1016	.0814	1.5598	1	.2117	.0000	1.1070
SEX(1)	.0449	.0505	.7907	1	.3739	.0000	1.0459
Constant	-2.8933	.3629	63.5555	1	.0000		

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AN EXAMPLE

The regression equation shown below was developed from the coefficients in table 5. With this equation, we can determine the odds of a respondent having access to a home computer. For example, if we take a Latino and a non-Latino respondent, both of whom are 25 years old, have a family income of $20,000, and completed a ninth grade education, then we can calculate how ethnicity impacts one's odds of accessing a home computer.

These results can be interpreted simply as the odds of a respondent having access to a home computer. As we can see, when income, age and education are held constant, the Latino respondent is still less likely to have access to a home computer than his non-Latino counterpart. The Latino in this demographic category has about an 8 percent chance of having access as compared to 12 percent for the non-Latino similarly situated.

$$Z = -3.9277 - .0156(AGE) + .0258(INCOME) + .4599(LATINO) + .1538(EDUCATE)$$
$$Z = -3.9277 - .0156(25) + .0258(20) + .4599(0 = nonlatino/1 = latino) + .1538(9)$$

$$Z_{latino} = 2.4175$$
$$Z_{nonlatino} = 1.9576$$

$$\text{PROBABILITY HOME COMPUTER ACCESS} = 1/1 + e^{Z}$$

$$PROB_{latino} = 1/1 + e^{(2.4175)} = .0818$$
$$PROB_{nonlatino} = 1/1 + e^{(1.9576)} = .1237$$

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TABLE 5

LOGISTIC REGRESSION ANALYSIS OF HOME COMPUTER ACCESS

VARIABLE	B	S E	WALD	DF	SIG	R	EXP(B)
AGE	-.0156	.0007	449.3167	1	.0000	-.0729	.9845
ETHNIC(1)	.4599	.0449	104.6979	1	.0000	.0349	1.5839
EDUCATE	.1538	.0047	1072.019	1	.0000	.1127	1.1663
INCOME	.0258	.0004	4037.528	1	.0000	.2189	1.0261
OCCUPATI			310.1207	3	.0000	.0601	
OCCUPATI(4)	.2603	.0179	211.0444	1	.0000	.0498	1.2973
OCCUPATI(3)	.1184	.0149	63.5015	1	.0000	.0270	1.1257
OCCUPATI(2)	-.0955	.0174	30.1917	1	.0000	-.0183	.9089
Constant	-3.9277	.0763	2652.705	1	.0000		

TABLE 6

LOGISTIC REGRESSION ANALYSIS OF HOME COMPUTER USE

VARIABLE	B	S E	WALD	DF	SIG	R	EXP(B)
AGE	-.0194	.0019	105.2278	1	.0000	-.0957	.9807
ETHNIC(1)	-.0826	.0612	1.8191	1	.1774	.0000	.9207
EDUCATE	.1117	.0118	90.2713	1	.0000	.0885	1.1182
INCOME	-.0030	.0010	8.8397	1	.0029	-.0246	.9970
OCCUPATI			87.9360	3	.0000	.0852	
OCCUPATI(1)	-.2814	.0561	25.1858	1	.0000	-.0453	.7548
OCCUPATI(2)	-.2482	.0456	29.6746	1	.0000	-.0495	.7802
OCCUPATI(3)	.1676	.0393	18.2158	1	.0000	.0379	1.1824
SEX	-.1665	.0239	48.4675	1	.0000	-.0642	.8466
Constant	-.0398	.1735	.0525	1	.8188		

EXPLANATION OF VARIABLES

AGE: age in years of the adult respondent, ranging from 15 to 90

CHILDREN: number of own children less than 18 in primary family

EDUCATE: educational attainment of respondent in years

ETHNIC: 0 = Latino; 1 = non-Latino

HOUSE: number of persons in household

INCOME: family income of householder in thousands of dollars

OCCUPATI: occupational sector: 1 = operators, fabricators, laborers and farmers; 2 = service; 3 = technical, sales and administrative support; 4 = managerial and professional

REGION: geographical region of the country: 1 = Northeast; 2 = Midwest; 3 = South; 4 = West

SEX: 0 = female; 1 = male

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